Eta Production in the pp Scattering

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1 Introduction

Zagreb-UCLA-ANL meson nucleon partial wave analysis[1] opened the possibility to explain the number of intermediate energy data. Important result of the PWA are the eta nucleon elastic T matrices. The three-body processes can serve us to lower the error of the two-body T matrices. The idea is to take two-body T matrices from existing PWA's and apply them to the three-body processes.

The most convenient process for that purpose is the $pp \to pp\eta$. It is the isospin 1/2 process, what enables us to test the half of the amplitudes at a time. Dominant contribution to the production process comes through meson-exchange[2], and decay of nucleon resonances[3, 4, 5].

2 Model

Our model has been described earlier[3]. Because of the large uncertainties in the treatment of final state interaction of the considered theoretical models[4, 5], we have decided to ignore its influence at the moment. The FSI is significant near threshold, so energies from 100 to 500 MeV would be the most convenient place to test this model. Unfortunately, in this range, experimental data are very hard to get. Preliminary results are given in the Figure 1.

3 Discussion

Light and dark lines show constructive and destructive total cross section, respectably. Enormous discrepancy below few MeV are expected because we have completely disregarded final state interaction. Our preliminary results again do not show rho meson dominance - which would be expected from most of the other models[5]. To get better picture about what is going on, we shall calculate further differential cross sections, and total cross sections for pn to ηpn. Completed results will be reported elsewhere.

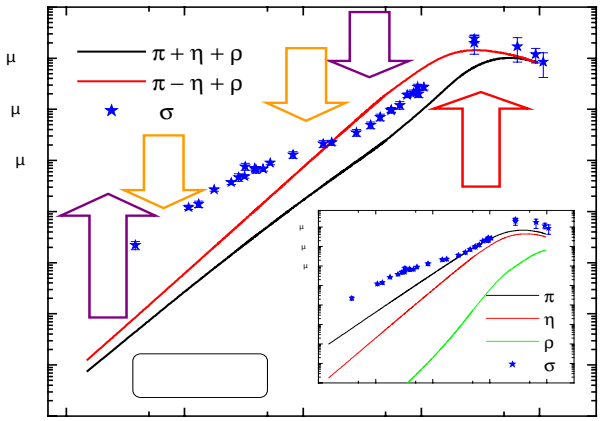

Figure 1: Experimental data are from [6]. Figure shows, qualitatively, not bad behavior of constructive sum of π and η contributions. Moreover, added corrections of initial and final interaction will push theoretical curve in the right direction. In the small graph is given contributions for each considered meson exchange.

References

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